North Carolina Department of Transportation
Transportation Program Management Unit - Value Management
Innovative Technologies and Products Awareness Report
May 31, 2018

PRODUCT HIGHLIGHT – Cast Iron ADA Detectable Warning Tiles

ADA warning tiles in place

The Advantage® Cast Iron Premier Tactile Tile System is an ADA compliant detectable warning tile manufactured by Advantage Tactile Systems. It is used to warn the visually impaired of upcoming crossings at various places including curb ramps, pedestrian crosswalks, transit platforms, or parking areas. They are installed just after the concrete has been poured so it can anchor into place once the concrete cures. The tiles are vented to allow displacement of concrete during installation and they are tamped into place with a rubber mallet or vibration mechanism.

These tiles share several features with plastic competitors including easy installation, the ability to be recycled, and availability in many sizes. However, because they are made from cast iron, they also have the ability to withstand abuse of heavy vehicular traffic such as snow plows, forklifts, and other rolling loads. They also require less maintenance. The tiles are manufactured in accordance with ASTM A-48, Class 35B Grey Cast Iron and comply with the "Buy America" policy.

Sizing and pricing can vary, but the cost can be estimated at $20-$23 per square foot. The initial cost can be offset by the life-cycle savings compared to other warning tiles. Particularly, in areas where the tiles will be under occasional traffic or where snow plows are used could see the greatest benefit. This product is currently approved and listed on the APL as NP17-7752. For more information, please visit:
https://www.advantagetactile.com/cast-iron-plates.html

Premier Tactile Tile System - Profile View

PRODUCT INNOVATION – Carbon Fiber Reinforced Polymer

Steel cable (top) and Carbon Fiber cable (bottom)

NCDOT, in partnership with NC State University, researched Carbon Fiber Reinforcement Polymer (CFRP) technology which is used as a replacement for traditional steel pre-stressing strands in pre-stressed concrete. CFRP consists of polyacrylonitrile based carbon fiber strands with epoxy resin used as a binding material.

Exposed steel reinforcement can cause early deterioration in pre-stressed concrete bridge girders when steel is exposed to corrosive environments such as coastal areas. This corrosion can cause costly repairs or even replacement of bridges after relatively short service lives. CFRP is lightweight, flexible, and provides high tensile strength. More importantly, it is not subject to corrosion and it does not require special concrete mix designs. Using CFRP in place of steel reinforcement is expected to lengthen the life of a bridge in corrosive environments and potentially reduce maintenance costs. This technology has been successfully used in Florida, Michigan, and Virginia in corrosive environments.

To implement this technology, the NCDOT is planning to use CFRP in a bridge replacement project in Harker's Island (B-4853). The CFRP, will be used in piles and girders to provide the pre-stressing tensile reinforcement in the concrete. This project will begin construction in the fall of 2019 and the Department will monitor the performance of the CFRP during the regular bridge inspection cycles.

CFRP Reinforcement Cage